

REMARKS

This Amendment, submitted in response to the Office Action dated April 4, 2005, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Claims 1-37 are now all of the claims pending in the present application.

I. Claim Objections

The Examiner objected to claims 25 and 26 for containing grammatical errors. Claims 25 and 26 have been amended as indicated in the Appendix. Consequently, the objection to claims 25 and 26 should be withdrawn.

II. Rejection of claims 7 and 17 under 35 U.S.C. § 112

Claims 7 and 17 have been rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner asserts that the recitation “said transformed image signals which contains a spatial frequency component corresponding to a grid array frequency of each possible stationary grid that may be used” is not sufficiently described in the specification.

The supporting descriptions for claims 7 and 17 are given at, for example, page 7, line 2 to page 8, line 3 in the specification of the present application. As described in the specification, “The ‘stationary grid’ used herein, as described later, may be a stationary grid which is actually used, or a stationary grid, differing in grid direction, which is to be used. Therefore, these stationary grids are included in the ‘stationary grid’ in the expression ‘in only the vicinity of a

grid array direction of the stationary grid’.” The “stationary grid” in claims 2 and 12 may be a stationary grid which is actually used, or a plurality of possible stationary grids which may be used. In the latter case, as recited in claims 7 and 17, the reducing step is performed in only the vicinity of a grid array direction of each of the possible stationary grids.

Therefore, Applicant submits that Applicant’s specification supports the recitation “said transformed image signals which contains a spatial frequency component corresponding to a grid array frequency of each possible stationary grid that may be used” of claims 7 and 17. Consequently, Applicant requests that the § 112, first paragraph rejection of claims 7 and 17 be withdrawn.

III. Rejection of claims 1-30 under 35 U.S.C. § 112

Claims 1-30 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner asserts that the recitation “in only the vicinity of an array direction of said periodic pattern” renders claim 1 indefinite because it is unclear what a “vicinity of an array direction” means. The Examiner is interpreting said recitation to mean a direction less than 90 degrees from the array direction.

Applicant refers the Examiner to page 6 of Applicant’s specification which states:

“The expression ‘in only the vicinity of a grid array direction of the stationary grid’ means to apply the suppressing process in the grid array direction of the

stationary grid or the neighboring directions, and means not to apply the suppressing process in the directions other than that, unlike applying the suppressing process independently of the grid direction, as in the conventional method... To speak in plainer language, the suppressing process may be applied in almost all grid directions of a stationary grid to be used."

In addition, Applicant also refers the Examiner to page 36, lines 5 through 10 in the specification of the present application, where the actual range of the "vicinity" is indicated. In the preceding paragraphs (page 34, lines 8 through 11), it is taught that the one-dimensional wavelet transformation is recursively and repeatedly performed in the grid length direction of the stationary grid. In addition, the specification, at page 36, lines 5 through 10, teaches that "it is preferable that one-dimensional wavelet transformation be repeated a few times."

In an exemplary embodiment of the present application, after the one-dimensional wavelet transformation is recursively repeated a few times in the length direction of the stationary grid, the signal value of a sub-band on the lowest frequency side is made zero (page 36, lines 11 through 15 in the specification). Accordingly, a low frequency component in a predetermined range in the length direction of the stationary grid is removed. The predetermined range corresponds to the width "W" (see Appendix marked-up Fig. 13) of the cross-hatched area with respect to the direction of the u-axis in marked-up Fig. 13. In this case, if the predetermined range is viewed from the array direction of the stationary grid, frequency components in the array direction of the stationary grid and directions in the vicinity of the array direction are removed.

Specifically, the stationary grid in an image has an even pattern with respect to the length direction of the stationary grid. However, the stationary grid has an uneven pattern, namely a striped pattern (periodic pattern), with respect to the array direction of the stationary grid. When the stationary grid is represented in a spatial frequency domain, the frequency component of the stationary grid with respect to the length direction thereof is a low frequency component, and that of the stationary grid with respect to the array direction thereof is a high frequency component. In the present invention, suppression processing is performed on the frequency component of the stationary grid with respect to the length direction thereof. In other words, the frequency component of the stationary grid with respect to the length direction thereof is removed when the low frequency component is removed by the suppression processing. Meanwhile, if the suppression processing is viewed from the array direction (direction of the v-axis in marked-up Fig. 13) of the stationary grid, a predetermined spatial frequency component in the array direction of the stationary grid and the vicinity of the array direction is removed. Accordingly, the spatial frequency component of the stationary grid with respect to the array direction of the stationary grid is also reduced. In other words, the spatial frequency component which forms a periodic pattern (see for example, claim 1) with respect to the array direction of the stationary grid is reduced.

As stated above, the actual range of the “vicinity” is clearly described in the embodiment of the present application. The actual range of the “vicinity” is a predetermined frequency range “W” (see appendix) with respect to the length direction of the stationary grid. Further, processing for obtaining the actual range is specifically disclosed in the embodiment of the

present application in which one-dimensional wavelet transformation is recursively and repeatedly performed a few times with respect to the length direction of the stationary grid. Therefore, the meaning of the term “vicinity” in the claims of the present application is clear.

Consequently, Applicant submits that the language “in only the vicinity of an array direction of said periodic pattern” is clearly defined in the specification. Therefore, the claims should be interpreted accordingly and the § 112, second paragraph of claims 1-30 should be withdrawn.

The Examiner also asserts that the phrase “said predetermined frequency” of claim 29 lacks antecedent basis. Claim 29 has been amended as suggested by the Examiner. Consequently, the rejection of claim 29 under § 112, second paragraph, should be withdrawn.

IV. Rejection of claims 1, 2, 11, 12, 21, 24, 27 and 28 under 35 U.S.C. § 102

Claims 1, 2, 11, 12, 21, 24, 27 and 28 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Yazici et al. (U.S. Patent No. 6,333,990).

In response to Applicant’s argument that Yazici does not disclose “reducing a transformed image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a frequency of said periodic pattern in only the vicinity of an array direction of said periodic pattern,” as recited in claim 1, the Examiner asserts that in Yazici, only grid line spectral component 380 is suppressed. Assuming *arguendo*, that the grid line component is reduced, Applicant submits that it is not

inherently that such suppressions occur in only the array direction of the periodic pattern as claimed.

Further, claim 1 recites “transforming said *original* image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain.” The transformed image signals, representing the original image signal, are then reduced in only the vicinity of an array direction of said periodic pattern. However, as indicated by the Examiner, edgy regions and high intensity regions of the x-ray image are removed before a transform. Col. 5, lines 37-40. Consequently, the transform occurs on a processed image signal rather than an original signal.

For at least these reasons, claim 1 and its dependent claims should be deemed allowable. Since claims 2, 11, 12, 21, and 24 recite similar elements, claims 2, 11, 12, 21 and 24 and their dependent claims should also be deemed allowable.

V. Rejection of claims 1, 2, 3, 11-13 and 22-23 under 35 U.S.C. § 102

Claims 1, 2, 3, 11-13 and 22-23 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Hara (U.S. Patent No. 6,173,086).

With respect to the Examiner’s comments on the first full paragraph on page 4, Applicant submits that the statement “Although the Examiner has cited Hara’s descriptions on col. 6, line 66-col. 7, line 15, Figure 3, and col. 6, lines 22 - 27 in the Detailed Action, these descriptions correspond to the **reducing step** of the present invention,” is a typographical error, and the statement should read “Although the Examiner has cited Hara’s descriptions on col. 6, line 66-

col. 7, line 15, Figure 3, and col. 6, lines 22 - 27 in the Detailed Action, these descriptions correspond to the **transforming step** of the present invention,” which is consistent with the arguments presented on page 17, first full paragraph of the Amendment filed February 14, 2005.

Further, the Examiner pointed out, on page 4 of the Office Action, that “Hara’s reducing step is incorporated in the transforming step, which is in line with the description provided on the bottom of page 41 and the top of page 42 of the Applicant’s specification.” However, the bottom of page 41 through the top of page 42 in the specification of the present application only describes that wavelet transformation is advantageous to obtainment of an enlarged/reduced image or transfer of images via a network is described. Therefore, no grounds for rejecting the present application are found in the portion of the specification of the present application.

Further, in Hara, frequency components of the image are classified by performing wavelet transformation on the original image (this processing corresponds to the “transforming step” in the present invention). In Hara, setting of a filter for classification processing is appropriately selected so that the LL component, which is one of a plurality of frequency components, does not include a component representing the stationary grid. The LL component is one of the plurality of frequency components ($= LL + LH + HL + HH$) which represent an original image (further, the LL component is used as the reduced image). In Hara, the component of the stationary grid is removed from the LL component. However, the component of the stationary grid remains in the frequency components LH, HL or HH. Therefore, the component of the stationary grid remains in the whole of the frequency components representing the original image. Therefore, please argue, as we argued in the response to the previous Office Action, that

unlike the present invention, in Hara, the component of the stationary grid is not removed from the original image.

Further, the Examiner pointed out that inverse-wavelet transformation is disclosed at col. 1, line 64 through col. 2, line 8 in Hara. However, the inverse-wavelet transformation is described only as expansion (decompression) processing which is performed on the image data which has been compressed by wavelet transformation. Therefore, Hara fails to teach or suggest that inverse-wavelet transformation is performed on a reduced image which is produced by reducing the stationary grid component by wavelet transformation.

The Examiner asserts on page 4, 2nd full paragraph, of the Office Action, that Hara clearly explains that an inverse-wavelet transformation is performed on the reduced image. However, as previously indicated, the wavelet transformation disclosed in Hara only corresponds to the transforming step as recited in claim 1. Hara does not disclose “transforming said transformed image signals into an inverse-transformed signal *in said real space domain*.” Hara merely utilizes the image, which is obtained from the wavelet transform (first step - reducing step), as the reduced size image, and it is not necessary to perform the inverse-wavelet transform (second step - transforming step) to obtain an image which has the same size with the original image

For at least the above reasons, claims 1, 2, 11, and 12 and their dependent claims should be deemed allowable.

VI. Rejection of claims 25 and 26 under 35 U.S.C. § 103

Claims 25 and 26 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Yazici et al. and Hara. Claims 25 and 26 should be deemed allowable by virtue of their dependency to claim 4 for the reasons set forth above.

VII. Rejection of claims 29-30 under 35 U.S.C. § 103

Claims 29-30 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Hara and Barski et al. (U.S. Patent No. 6,269,176). Claims 29 and 30 should be deemed allowable by virtue of their dependency to claims 1 and 12 for the reasons set forth above. Moreover, Barski does not cure the deficiencies of Hara.

VIII. New Claims

Applicant has adding claim 31-37 to provide a more varied scope of protection. Claims 31-37 should be deemed allowable by virtue of their dependency to independent claims for the reasons set forth above. Claims 32 and 33 recite subject matter similar to claims 4 and 5, but depend on claim 2, and claims 34 and 35 recite subject matter similar to claims 14 and 15, but depend on claim 12.

IX. Allowable Subject Matter

The Examiner has indicated that claims 4-6, 8-10, 14-16 and 18-20 contain allowable subject matter and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. At the present time, Applicant has not rewritten claims 4-6, 8-10, 14-16 and 18-20 in independent form, since Applicant believes they

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Appln. No.: 09/765,621

Attorney Docket No.: Q61229


will be deemed allowable, without amendment, by virtue of their dependency to independent claims for the reasons set forth above.

X. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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23373

CUSTOMER NUMBER

Date: October 4, 2005